United States Department of Agriculture

'SEA ISLE'

SOIL CONSERVATION SERVICE

Cape May Court House

NEW JERSEY

JAPANESE SEDGE

1987 Annual Report of the Cape May Plant Materials Center

A Summary of the North Atlantic Coastal Area Activities

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INTRODUCTION

This report covers the plant materials activities of the Cape May Plant Materials Center for calendar year 1987. Established in 1965, the Cape May PMC is located approximately 24 miles south of Atlantic City, New Jersey on US Route 9. The property is comprised of 88 acres. The area served by the Center includes the mid-Atlantic coastal plain and the piedmont extending from Cape Cod, Massachusetts to Cape Hatteras, North Carolina. The Major Land Resource Areas in each state are listed below:

Massachusetts
- 143 - Northeastern Mountains
- 144A - New England and Eastern New York Upland, Southern Part
- 144B - New England and Eastern New York Upland, Northern Part
- 145 - Connecticut Valley
- 149B - Long Island, Cape Cod Coastal Lowland

Connecticut
- 144A - New England and Eastern New York Upland, Southern Part
- 145 - Connecticut Valley

Rhode Island
- 144A - New England and Eastern New York Upland, Southern Part

New York
- 149B - Long Island - Cape Cod Coastal Lowland

New Jersey
- 144A - New England and Eastern New York Upland, Southern Part
- 148 - Northern Piedmont
- 149A - Northern Coastal Plain

Maryland
- 148 - Northern Piedmont
- 149A - Northern Coastal Plain
- 153B - Tidewater Area
- 153C - Mid-Atlantic Coastal Plain

Delaware
- 148 - Northern Piedmont
- 149A - Northern Coastal Plain
- 153C - Mid-Atlantic Coastal Plain

Virginia
- 133A - Southern Coastal Plain
- 136 - Southern Piedmont
- 153A - Atlantic Coast Flatwoods
- 153B - Tidewater Area
- 153C - Mid-Atlantic Coastal Plain

North Carolina
- 133A - Southern Coastal Plain
- 136 - Southern Piedmont
- 153A - Atlantic Coastal Flatwoods
- 153B - Tidewater Area

Purpose and Objectives of the Cape May PMC

To develop and promote the use of new and improved plants for the conservation of soil, water and related resources. To develop sound cultural methods and management techniques for the effective use of plants and soils.

Function

-- Collect and initially evaluate new plant materials including native collections, foreign plant introductions and strains from plant breeders.

-- Increase seed and/or plants of potential new releases.

-- Make advanced evaluations of selected accessions under simulated field conditions in comparison with a standard variety.

-- Determine cultural requirements of needed plant materials.

-- Make field evaluation plantings on problem sites in order to obtain information on plants at sites typical of eventual use.

-- Provide plant propagules for field plantings to Soil and Water Conservation Districts where the final evaluation of a new plant is to be made.

-- Develop, name and release new varieties in cooperation with the New Jersey Agricultural Experiment Station and other cooperating agencies.

-- Maintain and produce breeder or foundation seed or stock of released varieties at the center in accordance with standards of the cooperating agency.

Objectives of the Cape May PMC

1. Reduce excessive erosion on cropland.
2. Reduce coastal shoreline and tidal streambank erosion.
3. Improve water quality.
4. Conserve natural resources in urban and rural areas.
5. Improve techniques for managing organic waste.
6. Improve forage quality and management techniques on grasslands.
7. Improve fish and wildlife habitat.

DESCRIPTION OF AREA

The soils, topography, climate, and land use combine to produce a distinct plant resource area. The soil-forming materials include glacial outwash and underlying beds of sand, gravel, silt, and clay. Problems in this area include active sand dunes that exist along the coast, wind erosion which occurs on sandy cultivated fields, and water erosion on sloping cropland and stream bank erosion which threatens the tidal estuaries. The soils vary from excessively well drained to poorly drained and swampy. There are large tracts of tidal marsh around bays, river inlets and the ocean.

Topographic relief ranges from large areas of level or slightly sloping land to less extensive sections of moderately rolling ridges. The relatively level coastal plain rises from sea level to elevations of more than 600 feet in the piedmont. Level to gently undulating topography characterizes the coastal plain, while in the piedmont, gentle slopes and steep ridges are predominant.

The climate is tempered by the Atlantic Ocean. There are wide fluctuations in annual precipitation, and to a lesser extent, in temperature. Drought years do occur and tropical hurricane storms are common. Mean annual precipitation in the area ranges from 38 to 46 inches. The frost-free season varies from 170 to 250 days with the mean being 196 days. Length of growing season is affected by latitude and elevation. The Cape May PMC Service Area includes Plant Hardiness Zones 5-9.

Agricultural operations are predominantly cash row crops, orchards, truck crops, specialty crops, and poultry. Livestock enterprises have disappeared from many farms with a switch to continuous cultivated crops. This trend to cash crop operations has reduced the use of hay and pasture plants in the cropping systems. Clean cultivation on large tracts of land has increased soil erosion. The problem is especially prevalent on large open areas of flat sandy soils and all sloping land during periods of less than adequate soil cover.

Non-agricultural activities play a dramatic role in the use of conservation plants. There are large areas in hardwood and pine forests, much of which is neither managed for timber or wildlife. Extensive areas of tidal marsh are vital to the seafood and wildlife resources. Also, sand and gravel mining, expanding land transportation systems, increasing recreational facilities and construction of industrial, as well as residential developments, are all areas where plants can be used to stabilize disturbed areas.

Fifteen percent of the nation's population lives within commuting distance of the area served by the Center. In most areas, an extensive summer resort industry has expanded into a year-round enterprise creating a demand for high use recreational facilities.

Soil Descriptions

DOWNER LOAMY SAND, 0 to 5 percent slopes

Nearly level to gently sloping well-drained soils that have a loamy sand surface and sandy loam subsoil. Natural fertility and available water holding capacity is moderate. Permeability is moderately rapid. This soil is subject to severe wind erosion when exposed in fields. Irrigation is generally needed when growing vegetable crops.

GALESTOWN LOAMY SAND, 0 to 5 percent slopes

This nearly level to gently sloping well-drained soil has a thick sandy surface soil exceeding 20 inches. It has a sandy loam subsoil. The natural fertility is low and available water capacity is moderate. Its sandy surface is droughty. Permeability is rapid in the upper 2 feet and moderate in the sandy loam subsoil.

SASSAFRAS SANDY LOAM, 0 to 2 percent slopes

Nearly level well-drained soils that have sandy loam surface soils and sandy clay loam subsoils. It has medium natural fertility. This soil has moderate permeability and is subject to minor wind and water erosion. Irrigation is generally needed during extended dry periods.

WEATHER RECORDS AT CAPE MAY PLANT MATERIALS CENTER FOR 1987

	Air Temperature °F						4" Soil Temperature °F						Precipitation			
	Maximum			Minimum			Maximum			Minimum			Total	Devi-	Greatest	No.
Month	Ext.	Av.	Deviation		Av.	Ext.	Ext.	Av.	Deviation		Av.	Ext.	Inches	ation	Daily	Days
Jan.	57	42	+1	+2	25	-3	45	40	+1	+2	39	35	7.12	+3.59	2.18	9
Feb.	54	41	-1	-2	23	7	40	37	-2	-1	36	35	2.32	-0.86	1.35	4
March	73	53	+3	-1	33	20	59	49	+2	+1	43	37	3.72	+0.29	1.24	9
April	74	59	-1	+2	43	28	65	57	+1	0	51	45	4.08	+0.64	1.15	18
May	95	72	+3	0	51	32	75	62	-4	+1	62	53	2.84	-0.90	.89	11
June	95	83	+5	+3	63	47	85	81	+4	+4	75	71	1.60	-1.60	.50	9
July	100	88	+4	+3	68	52	89	85	+3	+3	80	70	2.06	-0.59	.52	9
Aug.	97	85	+2	0	64	47	83	79	-2	-5	71	67	3.67	-0.22	3.28	5
Sept.	88	79	+1	+1	59	38	77	71	-4	-4	67	62	2.89	+0.29	1.11	10
Oct.	75	65	-1	-6	40	26	66	57	-7	-10	51	47	3.38	-0.02	1.65	6
Nov.	76	59	+6	+1	40	17	56	50	-4	-6	45	35	2.35	-1.17	.98	5
Dec.	63	49	+3	+1	30	8	50	41	-4	-4	38	32	2.64	-1.23	.73	10
1987	100	65			45	-3	89	59			55	32	38.67	-1.78	3.28	105
Normal*		63			45			60			56		41			

*Normal based on:

22 yr. Air Temperature Average; 18 yr. Soil Temperature Average; 22 yr. Precipitation Average.

Frost free days 190 - April 1 to October 9, 1983 - Normal 191 days.

32.0 inches of snow were measured; this fell on 1/23, 1/27, 2/8, 2/23 and 3/13.

PERSONNEL

Manager	Donald W. Hamer
Soil Conservationist	Harold E. Yohn
Soil Conservationist	Noel J. Murray
Foreman	Wilson J. Merrick
Secretary	Barbara A. Turnier
Biological Aid	Peter McFadden (3/30-6/16) William Carey (7/15-10/23)

OTHER SPECIALISTS

David G. Lorenz, NENTC Plant Materials Specialist

Cluster R. Belcher, NJ Plant Materials Specialist

Stephen K. Salvo, NC Plant Materials Specialist

CAPE MAY PMC STATE CONSERVATIONISTS' ADVISORY COMMITTEE

Joseph C. Branco, NJ STC

Bobbye Jack Jones, NC STC

George Norris, VA STC

Rex Tracey, MA STC

Trade names used herein are for convenience only. No endorsement of products in intended, nor is criticism of unnamed products implied.

1. Cover Crop Assembly The search for a superior winter cover crop species began in 1983. The Cape May PMC is one of several PMC's participating in this project. The objective of this project is to select and release one or more winter hardy cultivars. The primary use of these cultivars will be on conventionally tilled soybean and corn fields, silage fields and land used to grow speciality crops such as tobacco, peanuts and vegetables. Ideally, these cultivars would be adapted to overseeding into standing crops and would not interfere with harvest operations while providing adequate cover before cold temperatures retard growth. An alternative is a cold tolerant cultivar which could be seeded after main crop harvest.

   In mid-October of 1986, one hundred ninety-one accessions were seeded at the PMC. The accessions, selected from an original assembly of 1200, included 141 grasses, 24 legumes and 34 forbs.

   By November 25, 'Aroostook' cereal rye (Secale cereale) provided the most rapid soil cover, having produced 40% soil cover. Many of the annual ryegrass (Lolium perenne multiflorum) accessions produced 30% cover, as did 'Balbo' cereal rye and an accession of perennial ryegrass (L. perenne), 9042559. The legumes were slow to establish and provided little cover at this time. The Brassica's germinated quickly but did not provide as much cover as they had in previous years; probably due to the fact that no fertilizer was applied this year. An early heavy frost had, also, severely damaged the young plants.

   By December 17, Aroostook had produced 50% ground cover. Balbo, along with the perennial ryegrass accession, one field brome (B. arvensis) accession (9040319) and a few of the annual ryegrass accessions, had covered 40% of the ground in their respective plots. One Brassica spp. accession (9039001) produced 30% soil cover despite cool temperatures.

   Throughout the winter months, Aroostook maintained 50% ground cover while the perennial ryegrass accession was observed to improve to 50% cover. Most of the annual ryegrass accessions had produced 40% soil cover, as did five downy chess (B. tectorum) accessions. The Brassica spp. accession and the field brome accession, also, covered 40% of the ground.

   By April 14, the perennial ryegrass accession had 70% of the ground covered. Both Aroostook and one accession of annual ryegrass (9012368) had produced 60% ground cover.

After evaluations were completed, 121 accessions were eliminated from the project. Of the 78 remaining accessions, sixteen are legumes, 13 are brassicas and 49 are grass species.

2. Winter Cover Crop Species for Erosion Control in Spring Planted Vegetables

Wind erosion is a problem in the vegetable farming areas along the mid-Atlantic Coastal Plain. The most critical problem is the airborne movement of sand particles across fields during periods of sparse soil cover. This can damage or destroy young plants by shredding leaves and breaking stems, and, in extreme cases, uprooting or burying the plants. This type of damage results in yield losses, extra production expenses for replánting fields and the loss of the economic advantage of an early crop.

In May of 1987, 1200 tomato and 1200 pepper plant seedlings were transplanted into plots of rye, wheat and barley. Transplanting was done in a manner which simulated three methods of field preparation and planting. The methods were: 1) no-till, which involved transplanting the vegetable seedlings directly into the grain which had been supressed with Paraquat 15 days earlier; 2) conservation tillage with wind barriers which involved plowing the small grain under except for three foot wide strips of grain which were left standing at 17 foot intervals; and 3) conventional tillage which involved plowing and preparing the entire plot area. After the plots were prepared, the vegetable seedlings were transplanted in 24-inch rows in such a manner that each of the three grain plots and the control plot were planted half and half with tomatoes and peppers. The plants were fertilized in June and irrigated as necessary throughout the growing season.

The tallest and widest vegetable plants were produced in the strip till plot which used rye grain as the wind barrier. The rye was the tallest grain in all three treatments. The strip till method offered several benefits: 1) it promoted faster growth of transplants since the cultivated soil warmed up quicker than the no-till land; 2) the grain strips acted as a wind barrier to protect the young plants from being damaged by wind and windblown sand, and 3) weed control was easily taken care of with cultivation.

In the no-till plot, the vegetable transplanting machine's press wheels did not have enough tension to sufficiently firm the soil around the base of the plant, necessitating some hand labor. It, also, became apparent that a pre-emergence herbicide application along with the burn down was necessary for good weed control. The barley plots had the most trouble with weeds, rye had the least.

The plants transplanted in the conventionally tilled plots were observed to have smaller and less abundant leaves at the base of the stalk than the strip-till and no-till plots. The stalks, also, were bent at the base, most likely the result of early spring winds.

3. Overseeding of Cover Crops into Conventionally Tilled Soybeans - FINAL REPORT

Soil erosion on conventionally tilled soybean fields after harvest is a severe problem. On most fields, soybean residue left on fields after harvest is often inadequate and conventionally planted cover crop species are usually seeded too late to produce sufficient vegetation to protect the field from erosion. The objective of this project is to evaluate various cover crop species to determine their potential for use as an aerially seeded or broadcast cover crop, and to determine the optimum date for seeding.

The Cape May PMC has been working on this project since 1983. During this time period, three legumes and four grass species were overseeded into both standing soybeans and soybean stubble. The species used included cereal rye (Secale cerale); annual ryegrass (Lolium perenne multiflorum); crimson clover (Trifolium incarnatum); hairy vetch (Vicia villosa); wheat (Triticum spp.); oats (Avena sativa); and black medic (Medicago lupulina).

Seeding was done by hand in an effort to simulate aerial seeding into the standing soybeans and broadcast seeding into the stubble. Four different seeding dates were tested each year. Generally, the seedings were on 15 day intervals beginning in mid-August and ending in mid-October. Plots measuring 20' x 30' were established and each species was replicated three times per seeding date. The control was not seeded.

During the three year project, it was observed that annual ryegrass and cereal rye produced similar levels of adequate soil cover by December when seeded between September 1 and October 1. Cereal rye, however, maintained or increased its soil cover through January and February while annual ryegrass cover tended to decline. One additional advantage of using cereal rye is that it may be harvested or used as forage before it is plowed under.

Annual ryegrass produced an extensive soil binding root system which tended to make field preparation difficult when plow down was delayed until late spring. A delay in plow down may have contributed to a weed problem. The plots which had annual ryegrass in them were clearly defined in the field the following year despite the fact that the field had been plowed and disked.

Unfortunately, none of the other species provided adequate cover during the winter months. In the check plots, plant litter left on the field after harvest covered an average of 55% and 45% of the ground one month after harvest during 1985 and 1986, respectively. This cover declined during the winter months as some material blew off the field and some, also, disintigrated, leaving mostly stems on the field.

To summarize, the best seeding dates for the cereal rye and ryegrass cover crops were September 1 to October 1. An August seeding date was too early because the soybean canopy prevented adequate light from reaching the ground. Use of earlier maturing varieties of soybeans may enable earlier seeding dates. Mid-October was too late because the cover crops did not have time to establish good soil cover before cold temperatures retarded growth. As a general rule, the overseeding of cover crops should be done when there is a 5% leaf drop from the soybeans.

Table 1

Ratings of average percent cover and average quantity of foliage for five species overseeded into conventionally tilled soybeans or soybean stubble, 1983-84 1/

Evaluation Date/ Species	Aug. 16		Sept. 1		Sept. 15		Oct. 14	
	% Cover	Quan. Foliage 2/	% Cover	Quan. Foliage	% Cover	Quan. Foliage	% Cover	Quan. Foliage
A. 11-18-83								
Secale cereale	53	2	68	1	70	2	52	4
Lolium perenne multi.	55	3	67	2	65	2	27	5
Trifolium incarnatum	<5	9	5	8	<5	9	<5	9
Medicago lupilina	7	7	18	6	10	8	5	8
Vicia villosa	15	5	32	4	27	6	5	7
B. 1-10-84								
Secale cereale	57	3	75	2	77	2	57	5
Lolium perenne multi.	42	5	60	3	55	4	22	8
Trifolium incarnatum	0	10	0	10	0	10	0	10
Medicago lupilina	5	8	18	7	7	8	5	9
Vicia villosa	22	6	37	5	33	5	10	8
C. 3-16-84								
Secale cereale	45	5	72	3	68	4	57	5
Lolium perenne multi.	20	7	43	5	37	6	8	9
Trifolium incarnatum	0	10	0	10	0	10	0	10
Medicago lupilina	<5	9	7	9	<5	9	0	10
Vicia villosa	12	8	32	6	28	7	7	9
D. 4-12-84								
Secale cereale	53	4	80	3	77	3	68	5
Lolium perenne multi.	23	7	47	5	38	7	15	9
Trifolium incarnatum	0	10	0	10	<5	9	0	10
Medicago lupilina	5	9	5	8	<5	9	<5	9
Vicia villosa	17	8	37	6	33	7	12	9

1/Seeding dates: 1st=8/16/83, 2nd=9/1/83, 3rd=9/15/83 and 4th=10/14/83; soybeans harvested 11/14/83.

2/Ratings: 1=Excellent; 3=Good; 5=Fair; 7=Poor; 9=Very Poor.

NOTE: Evaluations based on visual observations at the Cape May Plant Materials Center. Values listed are average of three replications per species per planting date.

Table 2

Monthly ratings of average percent cover, average vigor and average quantity of foliage for five species overseeded 1/ into conventionally tilled soybeans or soybean stubble, 1985-86

Evaluation Date/ Species	Aug. 16			Sept. 4			Sept. 16			Oct. 1		
	% Cov.	Vig.	Quan. Fol.	% Cov.	Vig.	Quan Fol	% Cov.	Vig.	Quan. Fol.	% Cov.	Vig.	Quan. Fol.
A. 11-5-85		2/	2/									
Secale cereale	<5	7	9	55	4	5	68	4	4	78	3	4
Lolium perenne multi.	13	5	8	55	3	5	72	3	3	63	4	5
Trifolium incarnatum	<5	8	9	13	6	7	32	5	5	20	6	7
Avena sativa	<5	8	9	22	5	6	45	4	5	38	5	6
Vicia villosa	<5	9	9	12	6	7	15	6	7	5	7	8
Residue	55	-	-	55	-	-	55	-	-	55	-	-
B. 12-9-85												
Secale cereale	<5	8	8	72	4	6	75	4	5	87	3	5
Lolium perenne multi.	13	5	7	73	3	5	87	3	4	77	4	4
Trifolium incarnatum	<5	9	9	18	6	7	42	5	5	25	5	6
Avena sativa	<5	9	9	32	8	6	55	7	5	35	7	6
Vicia villosa	<5	9	9	13	5	7	25	6	7	13	8	8
Residue	50	-	-	50	-	-	50	-	-	50	-	-
C. 1-6-86												
Secale cereale	<5	7	N/A	68	5	N/A	80	5	N/A	80	5	N/A
Lolium perenne multi.	5	7	"	70	6	"	88	6	"	78	6	"
Trifolium incarnatum	<5	9	"	12	8	"	43	7	"	27	7	"
Avena sativa	<5	10	"	22	10	"	50	10	"	30	10	"
Vicia villosa	<5	9	"	13	7	"	17	7	"	<5	8	"
Residue	45	-	-	45	-	-	45	-	-	45	-	-
D. 3-5-86												
Secale cereale	<5	8	9	63	6	7	70	7	7	90	7	6
Lolium perenne multi.	<5	9	9	52	8	7	80	7	6	68	8	7
Trifolium incarnatum	<5	7	9	10	7	8	42	7	8	25	7	9
Avena sativa	0	10	10	17	10	9	40	10	8	11	10	9
Vicia villosa	<5	10	10	17	8	8	22	9	8	<5	9	9
Residue	35	-	-	35	-	-	30	-	-	30	-	-

Table 2
(cont.)

Monthly ratings of average percent cover, average vigor and average quantity of foliage for five species overseeded 1/ into conventionally tilled soybeans or soybean stubble, 1985-86

Evaluation Date/ Species	Aug. 16			Sept. 4			Sept. 16			Oct. 1		
	% Cov.	Vig.	Quan. Fol.	% Cov.	Vig.	Quan Fol	% Cov.	Vig.	Quan. Fol.	% Cov.	Vig.	Quan. Fol.
E. 4-1-86												
Secale cereale	<5	3	6	78	4	4	82	3	4	95	4	4
Lolium perenne multi.	8	6	7	80	6	5	88	6	6	80	6	6
Trifolium incarnatum	7	6	8	23	5	6	70	4	6	42	5	7
Avena sativa	<5	10	10	42	10	9	40	10	9	8	10	9
Vicia villosa	<5	6	8	10	5	6	25	4	7	13	6	7
Residue	25	-	-	30	-	-	28	-	-	55	-	-

1/Seeding dates: 1st=8/16/85, 2nd=9/4/85, 3rd=9/16/85, and 4th=10/1/85; soybeans harvested 10/22/85.

2/Ratings: 1=Excellent; 3=Good; 5=Fair; 7=Poor; 9=Very Poor.

NOTE: Evaluations based on visual observations at the Cape May Plant Materials Center. Values listed are average of three replications per species per planting date.

Table 3

Monthly ratings of average percent cover, average vigor and average quantity of foliage for five species overseeded 1/ into conventionally tilled soybeans or soybean stubble, 1986-87

Evalaution Date/ Species	Sept. 4			Sept. 18			Oct. 1			Oct. 15		
	% Cov.	Vig. 2/	Quan. Fol. 2/	% Cov.	Vig.	Quan Fol	% Cov.	Vig.	Quan. Fol.	% Cov.	Vig.	Quan. Fol.
A. 11-14-86												
Secale cereale	43	4	6	25	4	6	37	6	7	13	7	9
Lolium perenne multi.	38	6	7	45	5	7	36	7	8	5	8	8
Trifolium incarnatum	<5	7	9	5	6	8	<5	8	9	<5	9	9
Avena sativa	17	7	6	40	5	5	35	7	7	12	7	7
Triticum sp.	5	5	8	<5	7	8	25	7	7	5	7	8
Residue	45	-	-	45	-	-	45	-	-	45	-	-
B. 12-15-86												
Secale cereale	55	5	5	48	4	4	63	5	5	37	5	6
Lolium perenne multi.	43	7	6	57	6	6	30	7	7	13	8	8
Trifolium incarnatum	<5	6	7	10	5	6	8	7	7	<5	8	9
Avena sativa	<5	9	9	15	8	7	5	9	8	<5	9	8
Triticum sp.	<5	5	5	5	6	5	35	6	6	13	6	6
Residue	40	-	-	40	-	-	40	-	-	40	-	-
C. 1-21-87												
Secale cereale	48	5	5	50	5	5	58	5	5	40	5	6
Lolium perenne multi.	28	7	7	52	6	6	27	7	7	17	8	7
Trifolium incarnatum	<5	7	8	8	6	7	6	7	8	<5	8	9
Avena sativa	<5	10	9	6	9	8	5	9	8	15	9	8
Triticum sp.	<5	6	6	5	6	6	28	6	6	15	6	7
Residue	40	-	-	37	-	-	43	-	-	42	-	-
D. 3-19-87												
Secale cereale	42	5	5	37	4	4	70	5	6	43	5	6
Lolium perenne multi.	28	8	7	50	5	6	32	7	8	12	8	8
Trifolium incarnatum	<5	7	7	12	7	7	5	8	9	<5	8	9
Avena sativa	0	10	10	5	9	9	<5	10	8	<5	10	10
Triticum sp.	<5	6	6	<5	7	7	23	7	6	10	8	6
Residue	27	-	-	25	-	-	25	-	-	25	-	-

Table 3
(cont.)

Monthly ratings of average percent cover, average vigor and average quantity of foliage for five species overseeded 1/ into conventionally tilled soybeans or soybean stubble, 1986-87

Evalaution Date/ Species	Sept. 4			Sept. 18			Oct. 1			Oct. 15		
	% Cov.	Vig.	Quan. Fol.	% Cov.	Vig.	Quan Fol	% Cov.	Vig.	Quan. Fol.	% Cov.	Vig.	Quan. Fol.
E. 4-22-87												
Secale cereale	>5	4	N/A	67	3	N/A	83	4	N/A	78	5	N/A
Lolium perenne multi.	80	5	"	82	4	"	62	5	"	50	5	"
Trifolium incarnatum	8	4	"	35	3	"	23	5	"	<5	7	"
Avena sativa	<5	8	"	5	6	"	<5	6	"	<5	6	"
Triticum sp.	17	6	"	5	6	"	75	5	"	57	5	"
Residue	20	-	-	25	-	-	20	-	-	20	-	-

1/Seeding dates: 1st=9/4/86, 2nd=9/18/86, 3rd=10/1/86, and 4th=10/15/86; soybeans harvested 10/17/86.

2/Ratings: 1=Excellent; 3=Good; 5=Fair; 7=Poor; 9=Very Poor.

NOTE: Evaluations based on visual observations at the Cape May Plant Materials Center. Values listed are average of three replications per species per planting date.

4. No Till Cropping Systems

No till farming methods have made significant progress towards reducing soil erosion on cropland. Further benefits are realized if crops are planted into living cover crops, in particular, legumes, which offer good soil cover, as well as nitrogen, to the crop.

In 1986, the Cape May Plant Materials Center began investigating the possibility of no tilling corn into established stands of 'Lathco' flatpea (Lathyrus sylvestris). Results were encouraging. Grain yields ranged from 91 to 110 bushels/acre and silage yields ranged from 11.9 to 15.8 tons/acre without a fertilizer application. In April 1987, the flatpea produced good regrowth in all but one of the six treatments (1 qt/acre Paraquat + 1.5 lbs./A cyanazide). Overall, regrowth was judged to be approximately 10% less than the previous spring.

On May 27, 1987, the flatpea was sprayed again with six herbicide treatments leaving the north end of the field as a control. Corn was no-tilled into the stand on May 27. It was planted in 30 inch rows; 1.5 inches deep. A side dressing of 60 lbs/A 34-0-0 was applied to half of each treatment plot on June 3.

Unfortunately, a combination of dry weather and irrigation equipment failure caused the corn to be stressed during the critical grain filling period. As a result, grain yields for 1987 were very poor. Insects, disease and birds caused further damage to the crop. The side dressing of fertilizer significantly increased stalk growth and vigor in all but one of the treatments. Silage yields for the fertilized subplots ranged from 5.25 to 7.4 tons/acre dry weight. This compared to a 3.05 to 6.6 tons/acre range produced in the unfertilized plots.

5. 'Tinga' Tangier Flatpea for Soil Protection

Since 1986, the Cape May PMC, along with several other PMC's, has been evaluating the ability of 'Tinga' Tangier flatpea (Lathyrus tingitanus) to provide soil protection as a cover crop. Tinga is a short-lived annual legume, native to Morocco. It can be seeded in the spring or fall. The purpose of the project is to determine the area of adaptation for the cultivar.

This year, Tinga was seeded in rod rows at the PMC in mid-May. The seeds germinated in 7-10 days, however, all but a few seedings were destoyed by rabbits by the first week of June. The rod rows were then replanted. These rows survived the rabbits, but they exhibited very poor vigor and only grew to a height of 6-10 inches. Very few plants flowered and none of them set seed. The plants were completely dead by mid-September.

A fall seeding was made in mid-September. Rabbit damage was again heavy, but those that survived produced 8-10 inches of decumbant growth. By mid-November, cold weather retarded growth and reduced vigor, but some of the plants were still showing some signs of life in late December.

None of the plants from the fall 1986 seeding survived the winter.

6. Eastern Red Cedar for Screens and Windbreaks

Vegetable crops, nurseries, vineyards and other valuable crops along the mid-Atlantic coastal plain can be severely damaged by high wind velocity. These prevailing winds also cause fine soil particles to become airborne resulting in erosion and extensive crop damage and/or loss. People, animals and buildings are also affected to some extent.

To reduce wind erosion, the wind velocity must be slowed to a non-erodible rate for a given soil or a protective cover must be established on the soil surface. Properly established windbreaks have proven successful in helping to overcome this problem. The objective of this project is to evaluate the Eastern red cedar (Juniperus virginiana) for a rapid growing strain that possesses semi-dense foliage and elliptical form.

Eastern red cedar is a native evergreen which has been used by homeowners and others for windbreaks and screening purposes. Its ability to grow in a variety of soils and climatic conditions, makes this species adaptable to a large range of site conditions.

In 1974, seed of Eastern red cedar was collected from fifty locations in several coastal states. Plants were propagated in nursery beds at the PMC by seed in 1975 and lined out in double row windbreak design in the spring of 1979. These plants have been evaluated annually for growth rate, form, branch density, seed production and injury from disease, insects and frost. The trees have varied significantly in growth rate and form within accessions as well as between accessions.

Selections were made during August 1986 and again in 1987. The selections were made according to the desirable characteristics of the individual trees, not by accession number. The 1987 selections reduced the number of trees remaining in the project to twenty-five.

7. Assembly of Sea Oats

Since 1982, the Cape May PMC has been conducting evaluations on sea oats (Uniola paniculata) with the objective of selecting a cold tolerant cultivar. Alternatively, a superior cultivar for use in southern climates would be released. Sea oats is a warm season perennial grass native to the frontal dunes along the Gulf of Mexico and lower Atlantic coasts. The northern most native stands of this species occur immediately north of the Chesapeake Bay. The species has an excellent sand stabilizing ability due to its bunch type growth habit, long thick leaves and dense fibrous roots. Presently, there are no known serious disease or insect problems associated with this species.

During 1987, evaluations continued on the 1986 Planting established on Assateague Island, part of the Chincoteague National Wildlife Refuge in Chincoteague, Virginia. All but one of the accessions planted there survived the winter. Generally, the accesssions which had the most vigorous plants the previous year produced the earliest regrowth. By the end of the summer, all of the accessions had flowered. Several accessions look extremely promising due to their thick, vigorous and uniform growth.

Evaluations also continued at the PMC. This year twenty-eight of the forty-seven four-year-old accessions flowered. Many produced viable seed. The plants on the center were not mulched this year, as they were in previous years, in order to determine their cold tolerance.

Two new plantings were established in 1987. One was in Barnegat Light, New Jersey and the other was in Fenwick Island, Delaware. Both of these were successful and most accessions had good foliage production and vigorous growth.

A Fertilization Study for sea oats was also established on Assateague Island this year. The purpose of the planting was to determine the effectiveness of fertilization, at the time the seedlings are transplanted on the dune, on growth and survival. Native seedlings are normally very slow to establish. However, the PMC plantings over the past few years have produced very rapid growth when fertilized at transplanting. By the end of the growing season, seedlings which were each fertilized with thirty grams of osmocote slow release fertilizer (18-6-12) in the hole at transplanting produced excellent growth and good vigor. Other seedlings, which had 500 lbs/Acre 10-10-10 fertilizer broadcast over them immediately after transplanting, produced less foliage and had less vigor than did the osmocote treated plants. The control plants, which had no fertilizer applied, were chlorotic and very spindly.

In December, the effects of fertilization were obvious. The foliage produced by the osmocote treated plants had caught a great deal of sand. The plants which were broadcast fertilized had less growth and had trapped less sand. The check plants, with very little foliage, were in danger of being blown out of the sand.

8. Evaluation of Seaside Goldenrod

Seaside goldenrod (Solidago sempervirens) is a native salt tolerant perennial forb that is well adapted to the mid-Atlantic coast. It grows on the fore dune as well as back dune areas. Individual plants may consist of several unbranched stems up to 3-4 feet tall that grow in open stands. The objective of this project is to select a superior cultivar which may be used along with American beachgrass and other species for sand dune stabilization.

The staff at the Cape May PMC has been conducting evaluations on goldenrod since 1982 when seventy-nine accessions were established on-center. During 1987, evaluations were made on fifteen accessions. Several accessions exhibited poor winter survival, poor uniformity and/or short growth habit. As a result, eight accessions were eliminated from the study, leaving seven accessions for further evaluations. These seven were selected for their tall growth habit, good vigor, abundant foliage production and winter hardiness.

9. Woody Plants for Sand Dune Stabilization

Drifting sand from back dune areas can be a serious problem in many places along the Altantic Coast. The back dune environment is quite different than that found on the frontal dunes. The back dunes are often shielded from high winds and shifting sand by the frontal dunes. As a result, pioneer plants such as American beachgrass (Ammophila breviligulata) are not well adapted to the back dunes. Secondary vegetation, most often woody species, must be relied on for stabilization of these areas. The objective of this project is to select superior woody cultivars adapted to back dune areas in MLRA 149 and 153.

In 1979, the Cape May PMC began evaluations on one hundred ninety-one accessions of four woody species. The assembly included (1) beach plum (Prunus maritima), (2) rugosa rose (Rosa rugosa), (3) wax myrtle (Myrica cerifera), and (4) bayberry (M. pensylvanica). The accessions were collected along the Atlantic coastal plain from Massachusetts to Georgia.

During 1987, a review of the data from previous evaluations allowed the PMC Staff to eliminate wax myrtle from further evaluations and reduce the beach plum and bayberry accessions to four each. These accessions were chosen for their superior survival rate, foliage production, vigor and gowth rate.

Two off-center beach plum plantings were established this year by the PMC Staff. One planting was located in Fenwick Island, Delaware. This planting did very well. The second planting was in Virginia Beach, Virginia. Unfortunately, high winds caused the sand to be blown from the base of the young trees shortly after planting. The blowing sand removed the bark from the trees, sandblasted young leaves and finally buried many of the trees during the fall.

Twelve rugosa rose accessions were selected and placed in a poly-cross block at the PMC in 1986. This planting will serve as the Breeder's Block when the cultivar is released.

10. Japanese Sedge Transplanting Techniques

In 1983, 'Sea Isle' Japanese sedge (Carex kobomugi) was released to the commerical market as a sand stabilizing plant. It is a semi-prostrate perennial with tough, grass-like leaves and thick rhizomes. This cultivar has not been widely accepted due to low survival rates of plants after transplanting on the sand dunes in the spring. Those that do survive are often slow to establish and spread. The primary causes of the poor survival rate are believed to be: 1)low soil moisture around the planting unit when the plant needs it to grow, and 2)damage to fragile rhizomes during processing and planting.

Since 1985, the Cape May PMC has been comparing survival rates, vigor and foliage production of spring and fall transplants. The plantings were made in Barnegat Light and Wildwood Crest, New Jersey. Super slurper, a moisture holding soil additive was also evaluated to determine if its use had any effect on plant survival.

The data collected over the past three years have shown a much better survival rate for plants which were transplanted in the fall when compared to spring transplanting dates during the first summer after establishment. Vigor and foliage production were also much better for the fall planting dates.

The use of super slurper has not shown consistent results. The planting at Wildwood Crest and the 85-86 planting at Barnegat Light had a higher survival rate for the control plants, while the 1987 spring planting had more surviving, vigorous plants in the super slurper treated plots.

11. Evaluation of Bitter Panicgrass

Bitter panicgrass (Panicum amarum) is a semi-prostrate, thick-stemmed, warm season perennial grass. The species is found on foredunes and backdunes along the mid and south Atlantic Coast. The northern most stands of the species are found in Delaware. It is an excellent sand stabilizer, particularly when grown with other sand stabilizing species. The objective of this project is to select a superior cultivar adapted to Delaware and southward along the mid-Atlantic Coast.

The Cape May PMC began evaluating forty-two accessions in 1983. By 1987, only five remained and two more were eliminated during the year. The three remaining accessions were selected for their early regrowth, vigor, and foliage production. A southern cultivar of the species, 'Ocracoke' is being used as the standard of comparison for this project.

12. Evaluation of American Beachgrass for Longevity

The plant used most for initial sand dune stabilization along the mid-Atlantic coast is American beachgrass (Ammophila breviligulata). The 'Cape' variety is considered to be the superior cultivar for use north of the Chesapeake Bay. However, Cape and other cultivars have exhibited a tendency to decline in vigor and eventually die in some locations even where recognized management techniques are followed. The die-out has been attributed to both insects and disease, but an exact cause of the problem has not been determined.

The purpose of this project is to evaluate promising accessions of American beachgrass against 'Cape' to determine if there is a cultivar with superior resistance to disease and insect damage which will allow it to outlive other cultivars on the sand dunes. So far, Cape has been evaluated against the 'Bogue' and 'Hatteras' varieties of American beachgrass. These varieties are commonly used for sand dune stabilization within the PMC service area.

In 1984, a replicated planting, using the three varieties, was established at the Back Bay Wildlife Refuge in Virginia Beach, Virginia. The planting is in a harsh site and it has been continually buffetted by high winds and buried under huge amounts of sand.

As of December 1986, all three cultivars were surviving to varying extents. The cultivar which was on the end of each rep which faced the ocean looked to be the best cultivar. In Rep I, it was Hatteras and in Rep II, it was Cape. By July of 1987, these cultivars were beginning to decline along the exposed edges of the planting. No sign of disease or insect damage was observed. It is thought that the plants on the edges are being dried out by the wind. The planting had become so high and pointed that the sand was easily blown from the slopes by the high winds, which exposed the roots of the plant.

The Bogue strain, located in the middle plot of both reps, appeared to be more vigorous than did the other cultivars. In both reps, it did not, however, produce very good cover. Nonetheless, it was rated as the best cultivar in both reps in December of this year, since the Hatteras in Rep I and the Cape in Rep II had declined substantially. Neither Hatteras nor Cape had grown well when located on the opposite end of the reps, further from the ocean.

A new planting was established at the Fort Story Army Base in Virginia Beach in April of this year. Two replications were established again using Bogue, Cape, and Hatteras. Unfortunately, high winds and foot traffic destroyed one replication. The survival rate in the remaining rep was very good. In December, the Bogue cultivar appeared to be very vigorous, whle the Hatteras and Cape had declined with the approach of winter.

13. Smooth Cordgrass for Tidal Bank Stabilization

The banks of coastal sounds and river estuaries exposed to storms and subject to tidal action are a severe erosion problem. The problem is acute in Virginia, North Carolina and Maryland and to a lesser extent in New Jersey and Delaware.

Smooth cordgrass (Spartina alterniflora) is a salt tolerant, perennial grass which grows in intertidal zones of saline and brackish marshes and along river banks. Its long, slender, flexible culms and its thick, rhizome root system form an extremely effective soil stabilizing cover on tidal banks.

Since 1977, the Cape May PMC has been evaluating accessions of smooth cordgrass in order to select a superior cultivar. The original assembly included 111 accessions. By 1987, the number of accessions being evaluated had been reduced to five. These accessions were evaluated at the PMC and on four off-center sites in Maryland and Virginia, including a 1987 planting in Tanyard, Maryland.

After evaluations were completed this year, three superior accessions were selected to go on to advanced evaluation. The selected accessions include: PI-421162, PI-421200 and PI-421228. A superior cultivar of smooth cordgrass when released will be used with saltmeadow cordgrass (S. patens) for complete stabilization of wetlands, marshes and river banks.

14. Pest Resistant Plants for Secondary Sand Dune Stabilization - FINAL REPORT

American beachgrass (Ammophila breviligulata) is well adapted to the foredunes along the Atlantic Coast. A superior cultivar of this species, known as 'Cape', was released to the commercial market in 1972. Since that time, it has become most often used for frontal sand dune stabilization from Massachusetts to Virginia.

American beachgrass is not well adapted to the backdune environment. Established stands of Cape, as well as native plants, will tend to decline shortly after sand accumulation ceases or fertility programs are discontinued. Some stands have declined even where recommened management techniques have been followed. The deterioration of American beachgrass is a natural process. However, the invasion of secondary species into some areas where beachgrass has delcined is very slow. It is believed that the decline is due to disease and/or insect pathogens. The result is large areas of dunes with little or no cover to hold sand in place.

Since 1978, the Cape May PMC has been testing several long-lived, salt tolerant perennial grasses for persistence and the ability to resist diseases and/or insects which are affecting Cape American beachgrass. Fertility management was evaluated.

There were several plantings established for this project including two in the Island Beach State Park in Ocean County, New Jersey during 1978 and 1979; three in Fenwick Island, Delaware in 1979, 1980 and 1981; and one in Duck, North Carolina in 1980. Unfortunately, only the Duck, North Carolina planting could be evaluated on a long term basis.

The initial plantings used eight test species along with Cape as a standard of comparison. These species included: mammoth wildrye (Elymus giganteus); Canadian wildrye (E. vancouverensis); European wildrye (E. arenarius); bitter panicgrass (Panicum amarum); and European beachgrass (A. arenaria). Later plantings were expanded to include three accessions of saltmeadow cordgrass (Spartina patens), Japanese sedge (Carex kobomugi) and European sedge (C. arenaria). In most plantings, the accessions were planted in three replications. Not all of the species were established in each planting. Fertilizer was applied at establishment.

In 1985, a fertility study was initiated at the 1980 Duck, North Carolina planting. Overall, the plants were in poor condition. Each of the three replications in the five-year-old planting were divided in half. One side was fertilized with 500 lbs/Acre 10-10-10 while the other side was left as a control. The fertilized applications were repeated twice more during the next two years.

In general, the data from this project shows Cape to be the superior plant during the first growth season. This fact is not significant since American beachgrass is not adapted to the backdune area. Several test species produced equal or better stands in the following years as Cape declined in the low fertility conditions.

Japanese sedge (PI-433953) is a slow starter, but once established, it has an excellent sand stabilizing ability. In the Delaware plantings, the plant provided a stand nearly equal to Cape by the end of the second growing season. Japanese sedge was also the best long term plant in the 1980 Duck, North Carolina planting. In two of the three reps, it had provided good ground cover while spreading up to twelve feet from the original plots by December 1983 despite low fertility conditions.

The three fertilizer applications beginning in August 1985 definitely increased the stand, cover and vigor of this species. By September of 1987, the sedge had spread approximately seventy-five feet east and thirty feet west from the fertilized areas of Reps I and II. The increased vigor and cover of the fertilized plants was clearly evidient even though the last fertilization was nearly ten months prior.

The saltmeadow cordgrass accessions (PI-421238, PI-421239, PI-421250), were slow starters in unfertilized conditions during the first growing season. However, in many of the plantings, they provided better cover and were more vigorous than Cape during the second year. PI-421239 may have a slight edge over the other two accessions but further evaluations are needed since their performance is similar. Response to fertilizer was clearly evident by the increased stand and vigor in the fertilized subplots.

Unfortunately, none of the other test species proved to be very persistent in the back dune environment. The wildrye accessions looked good during the first year, but declined within the next two years. European sedge did persist in two of the three reps, but it was not very vigorous and it provided little cover. European beachgrass appears to be less adapted to the backdunes than Cape as it died out after the first year.

One observation which was made during the project was the increase in vigor and stand of established plants when maintenance fertilizer is applied. The fertilized plants were larger and thus able to trap more blowing sand. Native species were also encouraged by the application of fertilizer. Volunteer coastal panicgrass, American beachgrass and various annual weedy species were observed in the fertilized plots.

Table 1

Evaluations of nine pest resistant species growing on a sand dune, 1981[1/]

Species	Acc. No.	Cover(%)[2/] Replication				Stand Replication				Regrowth[3/] Replication				Vigor Replication			
		I	II	III	Avg.	I	II	III	Avg.	I	II	III	Avg.	I	II	III	Avg.
Ammophila arenaria	9002675	-	-	-	-	9[4/]	10	10	10	-	-	-	-	-	-	-	-
A. breviligulata	'Cape'	60	50	55	55	1	2	2	2	2[4/]	3	1	2	2[4/]	4	2	3
Carex arenaria	9002688	-	-	-	-	9	9	10	9	-	-	-	-	-	-	-	-
C. kobomugi	PI-433953	15	35	10	20	5	2	7	5	4	3	5	4	2	3	4	3
Elymus arenarius	PI-348865	20	25	15	20	3	2	3	3	3	4	5	4	2	3	4	3
E. vancouverensis	PI-421134	15	35	N/A[5/]	25	3	2	N/A	3	3	3	N/A	3	3	2	N/A	3
Spartina patens	PI-421238	20	40	10(30)[5/]	25	4	3	7(4)	5	5	5	7(2)	6	5	5	7(4)	5
S. patens	PI-421239	25	25	40	30	2	3	2	2	4	6	1	4	3	5	2	3
S. patens	PI-421250	15	20	10	15	3	4	5	4	6	7	6	6	4	6	5	5

1/114 hills/accession/replication planted near Duck, NC on April 2, 1980; Data recorded April 28.
2/Cover-Includes dead and green foliage.
3/Regrowth-Amount of new foliage.
4/Ratings: 1=Excellent; 3=Good; 5=Fair; 7=Poor; 9=Very Poor; 10=None.
5/E. vancouverensis was not established in Rep III. An extra plot of S. patens (PI-421238) was established in its place.

Table 2

Evaluations of nine pest resistant species growing on a sand dune, 1983[1/]

Species	Acc. No.	Cover(%) Replication I	II	III	Avg.	Stand Replication I	II	III	Avg.	Regrowth Replication I	II	III	Avg.	Vigor Replication I	II	III	Avg.
Ammophila arenaria	9002675	0	0	0	0	10[2/]	10	10	10	-	-	-	-	10[2/]	10	10	10
A. breviligulata	'Cape'	25	60	60	48	4	3	4	4	-	-	-	-	4	5	3	4
Carex arenaria	9002688	5	5	0	3	6	9	10	8	-	-	-	-	4	4	10	6
C. kobomugi	433953	40	45	15	33	2	3	6	4	-	-	-	-	4	4	6	5
Elymus arenarius	348865	0	0	0	0	10	10	10	10	-	-	-	-	10	10	10	10
E. vancouverensis	421134	5	5	N/A[3/]	5	7	8	N/A	8	-	-	-	-	3	4	N/A	4
Spartina patens	421238	35	40	55(20)[3/]	38	4	3	4(6)	4	-	-	-	-	7	7	7	7
S. patens	421239	35	40	85	53	4	3	2	3	-	-	-	-	7	7	7	7
S. patens	421250	25	40	65	43	5	4	3	4	-	-	-	-	6	6	7	6

1/Planting was established April 2, 1980 near Duck, NC; Data recorded May 17.
2/ Ratings: 1=Excellent; 3=Good; 5=Fair; 7=Poor; 9=Very Poor; 10=None.
3/E. vancouverensis was not established in Rep III. An extra plot of S. patens (PI-421238) was established in its place.

Table 3

Evaluations of nine pest-resistant 1/ species growing on a sand dune, 1986

PI No./ Species/Rep	Stand		Cover		Vigor	
	NonFert.	Fert.	NonFert.	Fert.	NonFert.	Fert.
9002675						
Ammophila arenaria	2/		2/		2/	
I	10	10	10	10	10	10
II	10	10	10	10	10	10
III	10	10	10	10	10	10
'Cape'						
A. breviligulata						
I	10	10	10	10	10	10
II	8	6	9	7	7	4
III	8	6	3	6	7	5
9002688						
Carex arenaria						
I	8	6	9	7	9	6
II	8	7	9	9	8	5
III	10	10	10	10	10	10
PI-433953						
C. kobomugi						
I	6	2	5	2	6	2
II	5	1	6	1	5	1
III	7	8	7	9	8	7
PI-348865						
Elymus arenarius						
I	10	10	10	10	10	10
II	10	10	10	10	10	10
III	10	10	10	10	10	10
PI-421134						
E. vancouverensis						
I	10	10	10	10	10	10
II	10	10	10	10	10	10
III	10	10	10	10	10	10
PI-421238						
Spartina patens						
I	6	4	7	4	8	4
II	7	4	7	4	7	6
III-9	7	5	7	5	7	6
III	7	5	7	5	7	6

Table 3
(cont.)

Evaluations of nine pest-resistant 1/ species growing on a sand dune, 1986

PI No./ Species/Rep	Stand		Cover		Vigor	
	NonFert.	Fert.	NonFert.	Fert.	NonFert.	Fert.
PI-421239						
S. patens						
I	8	6	8	5	7	3
II	9	5	9	5	8	4
III	5	2	4	2	4	2
PI-421250						
S. patens						
I	8	5	9	6	7	4
II	8	6	8	6	7	4
III	8	5	8	6	8	6

1/Planted April 2, 1980 near Duck, NC; Data recorded Nov. 14.

2/Ratings: 1=Excellent; 3=Good; 5=Fair; 7=Poor; 9=Very Poor; 10=None; -=No Rating.

3/E. vancouverensis was not established in Rep III. An extra plot of S. patens (PI-421238) was established in its place.

Evaluated by:
J. David Hodges, Jr. District Conservationist
J. Chris Wise, DC Extension Agriculture Agent

Table 4

Effect of fertilizer on stand and vigor of nine pest-resistant species, 1987 1/

Species/Rep	Increase in stand due to response to fertilization	Increase in vigor due to response to fertilization	Foliage Height(cm) Fertilized	Foliage Height(cm) Nonfertilized
9002675				
Ammophila arenaria	2/	2/	2/	
I	DEAD	DEAD	-	-
II	DEAD	DEAD	-	-
III	DEAD	DEAD	-	-
'Cape'				
A. breviligulata				
I	DEAD	DEAD	-	-
II	POOR	FAIR	82	55
III	GOOD	GOOD	87	87
9002688				
Carex arenaria				
I	EXCELLENT	EXCELLENT	29	17
II	FAIR	GOOD	23	13
III	DEAD	DEAD	-	-
PI-433953				
C. kobomugi				
I	EXCELLENT	EXCELLENT	39	15
II	EXCELLENT	EXCELLENT	42	13
III	FAIR	GOOD	27	14
PI-348865				
Elymus arenarius				
I	DEAD	DEAD	-	-
II	DEAD	DEAD	-	-
III	DEAD	DEAD	-	-
PI-421134				
E. vancouverensis				
I	DEAD	DEAD	-	-
II	DEAD	DEAD	-	-
PI-421238				
Spartina patens				
I	GOOD	EXCELLENT	71	41
II	POOR	POOR	64	42
III	GOOD	EXCELLENT	78	42
III-9	EXCELLENT	EXCELLENT	73	44

Table 4
(cont.)

Effect of fertilizer on stand and vigor of nine pest-resistant species, 1987 1/

Species/Rep	Increase in stand due to response to fertilization	Increase in vigor due to response to fertilization	Foliage Height (cm) Fertilized	Foliage Height (cm) Nonfertilized
PI-421239				
S. patens				
I	EXCELLENT	EXCELLENT	84	43
II	GOOD	GOOD	73	38
III	EXCELLENT	EXCELLENT	92	56
PI-421250				
S. patens				
I	EXCELLENT	EXCELLENT	73	45
II	GOOD	EXCELLENT	68	48
III	PROBABLY NOT FERTILIZED BY MISTAKE			

1/Planted April 2, 1980 near Duck, NC; Data recorded Sept. 1; Fertilizer was first applied on August 25, 1985. At this time, the plants were in poor condition. The plots were randomly split and fertilizer was applied to half of the plot (10-10-10, 500 lbs/A). Fertilizer was applied again in May 86 and November 86 to the previously fertilized subplot. Species which are shown as dead were dead before fertilizer was applied with the exception of Rep I 'Cape'

2/Increase compared to non-fertilized subplot.

3/E. vancouverensis was not established in Rep III. An extra plot of S. patens (PI-421238) was established in its place.

Plants Available for Commercial Seed or Plant Production

1. 'Atlantic' Coastal Panicgrass (*Panicum amarum* var. *amarulum*)

'Atlantic' is a tall, robust, native warm season perennial grass. Its growth habit is upright, with stems reaching a height of 4 to 6 feet. The plants have the appearance of a bunch grass, although they produce short rhizomes. Atlantic has strong seedling vigor and reliable seed production under cultivation. It performs satisfactorily on sandy, droughty infertile soils and on heavy imperfectly drained soils.

The principal use of Atlantic is for stabilizing disturbed sandy sites. It can be direct seeded on sand dunes except for active frontal dunes. It has also been successfully established on surface mined areas, sanitary land fills, dredged spoil fills, sand and gravel mines, road side embankments and similar disturbed areas. While most stands of Atlantic are established by drilling the seed, small areas can be vegetated with seedling plants.

Field tests show Atlantic to be well adapted in the coastal plain and piedmont region from Massachusetts to Texas. It has also been grown inland in Pennsylvania and Ohio. Atlantic's resistance to lodging and its seed production also enhance its value as food and cover for wildlife.

It was cooperatively released by the Soil Conservation Service and the New Jersey Agricultural Experiment Station in 1981. Limited quantities of seed are available for commercial production.

2. 'Sea Isle' Japanese Sedge (*Carex kobomugi*)

Japanese sedge has been introduced onto the dunes from New Jersey south to Virginia. It is native to northeastern Asia and exhibits several desirable characteristics for stabilizing sand dunes. Japanese sedge, a salt tolerant tufted plant, differs from most related sedges by growing in dryer areas. The plant, which grows 8 to 10 inches tall, spreads primarily by short rhizomes which root at the nodes. Because of the short internodes, a mature stand of Japanese sedge is usually dense, with almost complete ground cover. This cool season plant remains green well into fall and can tolerate some, but not continuous foot traffic.

'Sea Isle' tends to be long-lived on stable sand dunes. In addition, Japanese sedge appears to be tolerant of pests and low soil fertility. Consequently, Sea Isle may exist under a low management level. However, it will flourish under high levels of management such as routine fertilization and protection from pedestrian or vehicle traffic.

During the establishment year, Japanese sedge may have a high mortality rate and exhibit little spread. However, after the first critical year, stands tend to improve continually in both vigor and density.

The plant was released in 1983 by the Soil Conservation Service and the New Jersey Agricultural Experiment Station. Limited quantities of plants are available for commercial production.

3. 'Cape' American beachgrass (Ammophila breviligulata)

'Cape' was released for commercial production in 1972. It is a superior strain of American beachgrass being used along the mid-Atlantic coast for initial stabilization and establishment of sand dunes. Cape is robust, easy to plant, and spreads rapidly by vigorous rhizomes. It has healthier leaves and thicker culms or stems than common American beachgrass. An adequate supply of Cape beachgrass plants are available for commercial production.

4. 'VA-70' Shrub Lespedeza (Lespedeza thunbergii)

'VA-70' shrub lespedeza is a herbaceous legume with a semi-woody stem. It is an upright perennial and its stems grow 4 to 6 feet tall. The leaves are more linear than oval and are approximately 2 inches long and one-half inch wide. Attractive pink to purple flowers appear in late summer. It is an excellent source of winter food and habitat for wildlife. Pheasants and bobwhite quail use its seed for food in fall and winter. Rabbit and deer browse the leaves and bees produce honey from the flowers.

You can use VA-70 shrub lespedeza almost anywhere that shrubs are appropriate. When used in hedges and borders, VA-70 is an attractive landscape feature. The plant is particularly well suited to seeding steep banks along channels and ditches or for wildlife borders along these water courses. It is useful as a border between cropland and woodland, as contour hedges between crop strips, along diversion terrace boundaries, and in small odd areas set aside for wildlife.

VA-70 shrub lespedeza can be used alone or with other plants. An adequate supply of seed is available for commercial production.

5. 'Emerald Sea' Shore Juniper (Juniperus conferta)

'Emerald Sea' is a low-growing or trailing evergreen shrub which grows to approximately one foot in height. Its needles are greenish blue, softer than most junipers, and one-half to one inch long. The needles retain their blue-green color very well during the winter, and mass plantings produce a dense and uniform ground cover.

Shore juniper is well suited for planting on sand dunes near the seashore where other junipers do not grow successfully. It has good salt tolerance and grows well in sandy soils.

Emerald Sea is often used for mass or border plantings around buildings and as foreground for taller plant groups. It is also a versatile ground cover plant for steep banks around buildings, parks, and playgrounds.

An adequate supply of unrooted cuttings are available for commercial production.

6. 'Rem-Red' Amur Honeysuckle (Lonicera maackii)

'Rem-Red' is a multi-stemmed, vase-shaped shrub that grows to a height of 8-12 feet. The plant is well suited for ornamental use or as a screen on large lots. Its primary use is to supply a source of food for wildlife during the critical winter period.

The plant's bright red fruit is about one-fourth inch in diameter and matures in late September and October. Amur honeysuckle grows best on deep, well-drained soil. The plant grows well in slightly acid soils with a sandy, loamy, or moderately clayey texture.

Rem-Red was released in 1970 as a multi-purpose plant. An adequate seed supply exists for commercial production.

7. 'Avalon' Saltmeadow Cordgrass (Spartina patens)

'Avalon' is a strongly rhizomatous, salt tolerant perennial grass that grows up to 2 1/2 feet tall. Its rhizomes are long and slender and produce most of the new growth.

Avalon is unique in that it spreads quickly and produces a more dense root system and finer roots than most other saltmeadow cordgrass strains.

The principal conservation use of Avalon is to vegetate and restabilize brackish and fresh water tidal streambanks. It is salt tolerant and can be established immediately above the mean high tide elevation. It is well adapted to a range of soils, will tolerate occasional inundation by storm tides and has the ability to trap and grow through thin layers of sand.

Avalon is also adapted to low elevation coastal sand dunes and can be used to supplement other sand dune vegetation.

For establishment, both potted and bare-root plants can be used. An adequate supply of bare-root plants is available for commercial production.

1987 PMS ACTIVITIES OF NC, SC AND VA

In FY-87, 85 requests for plant materials were made to 10 PMC's. Thirty-two requests(37%) were sent to the Cape May Plant Materials Center. All of these requests were filled by the PMC. This amounted to over 17,000 plants and nearly 800 pounds of seed shipped to ten field offices in North Carolina, eleven field offices in South Carolina and five field offices in Virginia. The support of the Cape May PMC is instrumental to the success of the plant materials program in the mid-Atlantic states.

ESTABLISHING 'ATLANTIC' COASTAL PANICGRASS AND 'CAPE' AMERICAN BEACHGRASS

'Atlantic' coastal panicgrass seems to have more resistance to the pests of dune vegetation than 'Cape' American beachgrass. However, Atlantic is not entirely resistant to the pests. It has been proven that seeded species cannot be successfully established alone on large sand dunes in the presence of unstable sand. Likewise, successful establishment of seeded species, i.e. Atlantic, must be drilled to enhance germination and emergence.

Sometimes a multi-species stand is desirable on sand dunes. This would be especially suitable where beachgrass might be short lived. The objective of this project was to establish successful stands of Atlantic and Cape at the same time as dual-species vegetation.

In 1985, a planting of Cape was established in the usual manner but with a row spacing of 36 inches. It was repeated in 1986. Previous plantings of Atlantic in stable sand had confirmed its adaptation to drilling on sand dunes. Once the Cape was growing and the sand had been 'stilled' Atlantic was seeded between the established rows of Cape. A light weight garden seeder was used to drill the Atlantic seed. Results have been very good.

The most desirable method is to establish Cape in rows spaced 3 feet apart at the normal planting time. The rows should be perpendicular to the early spring winds. The Cape plants tend to prevent sand movement which might uncover the Atlantic seed or cover them too deep for emergence. Once the Cape has begun to grow, drill the Atlantic seed between the existing rows of Cape. It is important to drill the seed between 1 and 2 inches deep. The best planting dates are April 1-10 for the coast of Virginia and April 10-20 for New Jersey. Adequate moisture must be available to germinate the seed and provide for initial emergence. The Cape plants tend to compliment the initial growth of Atlantic. Atlantic is not only longer lived than Cape but responds to a lower level of management. Therefore, on diseased sites, the use of Atlantic might be one means to provide longer term cover as the Cape dies out.

FERTILIZATION OF AMERICAN BEACHGRASS ON SAND DUNES

American beachgrass is the primary herbaceous cover on sand dunes along the mid-atlantic coast. 'Cape' variety is the predominant cultivar marketed and planted on sand dunes in the northern portion of this area.

About 1980, in certain areas, the decline of beachgrass cover on sand dunes seemed to accelerate. These areas of decline ranged from complete dieout of all vegetation to only reduced stands. At that time, several pests were identified on the sites. Research scientists did not feel any one of these organisms alone could be lethal to beachgrass or other dune vegetation. It was hoped that this was the low point in the advance/decline cycle. Yet the decline continued.

Scientific research conducted in the 1960's indicated that 80 to 100 lbs of nitrogen per acre plus liberal amounts of phosphorus and potash produced good stands of American beachgrass. Since fertilizer costs were cheap this recommendation was not refined.

There is little doubt that some fertilizer is necessary for the satisfactory growth and maintenance of dune cover for American beachgrass. The issue of how much fertilizer is needed to maintain beachgrass on sand dunes surfaced several years ago. The question was raised because of the possibility of ground water pollution and the cost of the resource.

Consequently, most literature on the maintenance of sand dune vegetation recommend annual applications of fertilizer, especially nitrogen. The current written recommendations is 80 lbs of nitrogen per acre applied each spring. Some long term fertilizer trials on established stands of beachgrass indicate a lower rate of nitrogen will maintain vigor and cover. In fact, 100 lbs of nitrogen per acre applied in one year on established beachgrass plants tended to produce vigorous vegetation. However, the stand of beachgrass was severely reduced in the year following the fertilizer application. This was confirmed at several sites over a period of years.

Maintenance fertilizer for established stands of beachgrass should not exceed 50 lbs of nitrogen per acre per year. In fact, one half of this rate maintained a good stand for two years and provided adequate cover. The 50 lbs of nitrogen per acre should be applied each spring after regrowth begins. The fertilizer recommendation for new plantings of beachgrass is not changed.

It must be emphasized that Cape American beachgrass, in general, is a pioneer plant and normally is succeeded by other species as the dune environment is stabilized. Fertilizer may not prevent the dieout of American beachgrass on pest infested dunes.

Prepared by:
CLUSTER R. BELCHER, PMS
Somerset, NJ
January 1986

MID-ATLANTIC FIELD PLANTINGS

EVALUATION PURPOSE

STATE	BEAU	CAXX	CAWL	COCR	EACW	FORG	SAED	WAMG	WIND	WLDF	TOTAL
CT	1	5	0	1	4	0	0	0	0	9	20
DE	0	3	0	3	0	1	15	1	0	7	30
MD	5	12	5	4	3	8	0	6	0	5	48
MA	0	9	2	0	3	0	0	0	0	0	14
NJ	0	2	0	0	5	1	0	4	2	4	18
RI	0	1	0	3	0	0	3	0	0	3	10
	6	32	7	11	15	10	18	11	2	28	140

PURPOSE CODES

BEAU - Beautification

CAXX - Critical Area

CAWL - Tidal Banks

COCR - Cover Crops

EACW - Stream Channels

FORG - Forages

SAED - Sand Dunes

WAMG - Waste Management

WIND - Windbreaks

WLDF - Wildlife

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PLANT MATERIALS CENTER
CAPE MAY COURT HOUSE, NEW JERSEY 08210

Documentation of a Plant Accession Selected for Advanced Testing

Species:	*Spartina alterniflora* Loiseleur
Common Name:	smooth cordgrass
Plant Symbol:	SPAL
Accession Number(s):	PI-421162, PI-421200, PI-421203, PI-421228, PI-421230
Origin:	All are from New Jersey except PI-421162 which is from Maryland.
Method of Selection:	These accessions were selected from an original assembly of 111 accessions. They were selected for their superior survival, vigor, rhizome spread, rhizome production and resistance to disease and insects.
Description:	Smooth cordgrass is a salt tolerant, perennial grass which is found naturally in the inter-tidal zone along tidal marsh areas extending from Maine to Texas. Its flexible culms, vary from 1.5 to more than 4 feet tall. The rhizomes of smooth cordgrass form extensive colonies and are important soil builders and soil binders in coastal and interior marshes.
Anticipated Conservation Use:	For stabilization and revegetation of tidal banks and wetlands at the inter-tidal zone.
Potential Area of Adaptation:	Accessions are adapted along the coast from Nags Head, North Carolina to Cape Cod, Mass. Additional trials will be conducted to determine its adaptation to more southernly locations.
Potential Soil Adaptation:	Varying soils below the intermediate zone from coarse sand to clay and muck.
Where Plants Will Be Maintained:	Cape May Plant Materials Center Cape May Court House, New Jersey
Prepared By:	Cape May PMC Staff August 11, 1987

CAPE MAY PMC

1987 SEED PRODUCTION

Name	Acc. No.	Production (Lbs.)
Glycine max		495
Juniperus virginiana	Various	4
Panicum amarum	'Atlantic'	397
Panicum virgatum	PI-421138	246
Prunus maritima	Various	1
Rosa rugosa	9055900	10
Secale cereale	9047052	100

CAPE MAY PMC

1987 PLANT PRODUTION

Name	Acc. No.	Production (No.)	
Ammophila breviligulata	'Cape'	114,050	
" "	'Hatteras'	2,000	
" "	'Bogue'	2,000	
" "	9047071	2,600	
" "	9047072	4,000	
" "	9047073	4,000	
Carex kobomugi	'Sea Isle'	2,685	
Elaeagnus umbellata	PI-421132	500	(Cuttings)
Juniperus conferta	'Emerald Sea'	75	(Potted)
" "		1,000	(Cuttings)
Lonicera maackii	'Rem-Red'	102	
Panicum amarum	Various	2,235	
Phalaris arundinacea	269728	4,400	(plugs)
Prunus maritima	Various	625	
Robinia pseudoacacia	Various	120	(cuttings)
Solidago sempervirens	9002882	200	(Potted)
Spartina alterniflora	Various	25	(Bare-root)
" "		40	(Potted)
S. patens	'Avalon'	155,800	(Bare-root)
" "	Various	6,220	(Bare-root)
Tomatoes	Commercial	2,500	
Uniola paniculata	Various	1,774	(Potted)